U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
Washington, D.C. 20234

NBS Misc. Publ. 253*
Issued Nov. 1963
Price 5c ea.; $2.50 per 100

RECOMMENDED UNIT PREFIXES

As adopted by International Committee on Weights and Measures.
Reprinted from NBS Technical News Bulletin, Feb. 1963, issued monthly, $1.50 yr.* Also see The Metric System of Measurement, NBS Misc. Publ. 232, 50c.*

Multiples and submultiples	*Prefixes*	*Symbols*	*Pronunciation*
10^{12}	tera	T	tĕr′ ə
10^{9}	giga	G	jĭ′gə
10^{6}	mega	M	mĕg′ ə
10^{3}	kilo	k	kĭl′ ō
10^{2}	hecto	h	hĕk′ tō
10	deka	da	dĕk′ ə
10^{-1}	deci	d	dĕs′ ĭ
10^{-2}	centi	c	sĕn′ tĭ
10^{-3}	milli	m	mĭl′ ĭ
10^{-6}	micro	μ	mī′ krō
10^{-9}	nano	n	năn′ ō
10^{-12}	pico	p	pē′ kō
10^{-15}	femto	f	fĕm′ tō
10^{-18}	atto	a	ăt′ tō

DEFINED VALUES AND CONVERSION FACTORS

Meter..... 1 650 763.73 wavelengths of the transition $2p_{10}$ – $5d_5$ in ^{86}Kr

Kilogram..... mass of the international kilogram

Second..... 1/31 556 925.974 7 of the tropical year 1900

Degree Kelvin..... In the thermodynamic scale, 273.16 °K = triple point of water (fp, 273.15 °K=0 °C)

Unified atomic mass unit, u ..... 1/12 the mass of an atom of the ^{12}C nuclide

Standard acceleration of free fall ..... 9.806 65 m s^{-2}, 980.665 cm s^{-2}

Normal atmosphere..... 101 325 N m^{-2}, 1 013 250 dyn cm^{-2}

Thermochemical calorie ..... 4.1840 J, 4.1840×10^7 erg

Int. Steam Table calorie ..... 4.1868 J, 4.1868×10^7 erg

Liter..... 0.001 000 028 m^3, 1 000.028 cm^3 (recommended by CIPM, 1950)

Inch..... 0.0254 m, 2.54 cm

Pound (avdp.)..... 0.453 592 37 kg, 453.592 37 g

*For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402

GENERAL PHYSICAL CONSTANTS RECOMMENDED BY NAS–NRC Adopted by NBS[1]

Constant	Symbol	Value	Est.* error limit	Unit: Système Intern. (MKSA)		Unit: Centimeter gram second (CGS)	
Speed of light in vacuum	c	2.997925	3	$\times 10^{8}$	m s^{-1}	$\times 10^{10}$	cm s^{-1}
Elementary charge	e	1.60210	7	10^{-19}	C	10^{-20}	cm$^{1/2}$g$^{1/2}$†
		4.80298	20	.....	.....	10^{-10}	cm$^{3/2}$g$^{1/2}$s^{-1}‡
Avogadro constant	N_A	6.02252	28	10^{23}	mol^{-1}	10^{23}	mol^{-1}
Electron rest mass	m_e	9.1091	4	10^{-31}	kg	10^{-28}	g
Proton rest mass	m_p	1.67252	8	10^{-27}	kg	10^{-24}	g
Faraday constant	F	9.64870	16	10^{4}	C mol^{-1}	10^{3}	cm$^{1/2}$g$^{1/2}$mol^{-1}†
Planck constant	h	6.6256	5	10^{-34}	J s	10^{-27}	erg s
Fine structure constant	α	7.29720	10	10^{-3}	.....	10^{-3}	.....
Charge to mass ratio for electron	e/m_e	1.758796	19	10^{11}	C kg^{-1}	10^{7}	cm$^{1/2}$g$^{-1/2}$†
		5.27274	6	.....	.....	10^{17}	cm$^{3/2}$g$^{-1/2}$s^{-1}‡
Rydberg constant	R_∞	1.0973731	3	10^{7}	m^{-1}	10^{5}	cm^{-1}
Gyromagnetic ratio of proton	γ	2.67519	2	10^{8}	rad s^{-1}T^{-1}	10^{4}	rad s^{-1}G^{-1}†
Uncorrected for diamagnetism, H_2O	γ'	2.67512	2	10^{8}	rad s^{-1}T^{-1}	10^{4}	rad s^{-1}G^{-1}†
Bohr magneton	μ_B	9.2732	6	10^{-24}	J T^{-1}	10^{-21}	erg G^{-1}†
Gas constant	R	8.3143	12	10^{0}	J°K^{-1}mol^{-1}	10^{7}	erg°K^{-1}mol^{-1}
Boltzmann constant	k	1.38054	18	10^{-23}	J°K^{-1}	10^{-16}	erg°K^{-1}
First radiation constant ($2\pi hc^2$)	c_1	3.7405	3	10^{-16}	W m^2	10^{-5}	erg cm^{2}s^{-1}
Second radiation constant	c_2	1.43879	19	10^{-2}	m°K	10^{0}	cm°K
Stefan-Boltzmann constant	σ	5.6697	29	10^{-8}	W m^{-2}°K^{-4}	10^{-5}	erg cm^{-2}s^{-1}°K^{-4}
Gravitational constant	G	6.670	15	10^{-11}	N m^{2}kg^{-2}	10^{-8}	dyn cm^{2}g^{-2}

*Based on 3 std. dev., applies to last digits in preceding col. †Electromagnetic syst.
‡Electrostatic syst. [1] Reprinted from NBS Technical News Bulletin, Oct. 1963.

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
Washington, D.C. 20234

NBS Misc. Publ. 253*
Revised May 1969
Price 10c ea.; $6.25 per 100

RECOMMENDED UNIT PREFIXES

As adopted by International Committee on Weights and Measures

Multiples and submultiples	Prefixes	Symbols	Pronunciation
10^{12}	tera	T	tĕr' ə
10^{9}	giga	G	jĭ' gə, jē' gə
10^{6}	mega	M	mĕg' ə
10^{3}	kilo	k	kĭl' ō
10^{2}	hecto	h	hĕk' tō
10^{1}	deka	da	dĕk' ə
10^{-1}	deci	d	dĕs' ĭ
10^{-2}	centi	c	sĕn' tĭ
10^{-3}	milli	m	mĭl' ĭ
10^{-6}	micro	μ	mī' krō
10^{-9}	nano	n	năn' ō
10^{-12}	pico	p	pē' kō
10^{-15}	femto	f	fĕm' tō
10^{-18}	atto	a	ăt' tō

DEFINED VALUES AND CONVERSION FACTORS

Meter, m ..... 1 650 763.73 wavelengths of the transition $2p_{10} - 5d_5$ in ^{86}Kr

Kilogram, kg ..... mass of the international kilogram

Second, s ..... 1/31 556 925.974 7 of the tropical year 1900. 9 192 631 770 periods of cesium frequency

Kelvin, K ..... In the thermodynamic scale, 273.16 K = triple point of water (fp. 273.15 K = 0 °C)

Unified atomic mass unit, u ..... 1/12 the mass of an atom of the ^{12}C nuclide

Standard acceleration of free fall ..... 9.806 65 m s^{-2}, 980.665 cm s^{-2}

Normal atmosphere ..... 101 325 N m^{-2}, 1 013 250 dyn cm^{-2}

Thermochemical calorie ..... 4.1840 J, 4.1840×10^7 erg

Int. Steam Table calorie ..... 4.1868 J, 4.1868×10^7 erg

Liter ..... 0.001 cubic meter

Mole ..... amount of matter having same number of formula units as atoms in 0.012 kg ^{12}C

Inch ..... 0.0254 m, 2.54 cm

Pound (avdp.) ..... 0.453 592 37 kg, 453.592 37 g

*For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

GENERAL PHYSICAL CONSTANTS RECOMMENDED BY NAS–NRC Adopted by NBS[1]

Constant	Symbol	Value	Est.* error limit	Unit: Systeme Internat. (MKSA)		Unit: Centimeter-gram-second (CGS)	
Speed of light in vacuum	c	2.997925	3	$\times 10^{8}$	m s^{-1}	$\times 10^{10}$	cm s^{-1}
Elementary charge	e	1.60210	7	10^{-19}	C	10^{-20}	$cm^{1/2} g^{1/2}$ †
		4.80298	20	.....	.....	10^{-10}	$cm^{3/2} g^{1/2} s^{-1}$ ‡
Avogadro constant	N_A	6.02252	28	10^{23}	mol^{-1}	10^{23}	mol^{-1}
Electron rest mass	m_e	9.1091	4	10^{-31}	kg	10^{-28}	g
Proton rest mass	m_p	1.67252	8	10^{-27}	kg	10^{-24}	g
Faraday constant	F	9.64870	16	10^{4}	C mol^{-1}	10^{3}	$cm^{1/2} g^{1/2} mol^{-1}$ †
Planck constant	h	6.6256	5	10^{-34}	J s	10^{-27}	erg s
Fine structure constant	α	7.29720	10	10^{-3}	.....	10^{-3}	.....
Charge to mass ratio for electron	e/m_e	1.758796	19	10^{11}	C kg^{-1}	10^{7}	$cm^{1/2} g^{-1/2}$ †
		5.27274	6	.....	.....	10^{17}	$cm^{3/2} g^{-1/2} s^{-1}$ ‡
Rydberg constant	R_∞	1.0973731	3	10^{7}	m^{-1}	10^{5}	cm^{-1}
Gyromagnetic ratio of proton	γ	2.67519	2	10^{8}	rad $s^{-1} T^{-1}$	10^{4}	rad $s^{-1} G^{-1}$ †
(Uncorrected for diamagnetism, H_2O)	γ'	2.67512	2	10^{8}	rad $s^{-1} T^{-1}$	10^{4}	rad $s^{-1} G^{-1}$ †
Bohr magneton	μ_B	9.2732	6	10^{-24}	$J T^{-1}$	10^{-21}	erg G^{-1} †
Gas constant	R	8.3143	12	10^{0}	$J K^{-1} mol^{-1}$	10^{7}	erg $K^{-1} mol^{-1}$
Boltzmann constant	k	1.38054	18	10^{-23}	$J K^{-1}$	10^{-16}	erg K^{-1}
First radiation constant ($2\pi hc^2$)	c_1	3.7415	3	10^{-16}	W m^2	10^{-5}	erg $cm^2 s^{-1}$
Second radiation constant	c_2	1.43879	19	10^{-2}	m K	10^{0}	cm K
Stefan-Boltzmann constant	σ	5.6697	29	10^{-8}	W $m^{-2} K^{-4}$	10^{-5}	erg $cm^{-2} s^{-1} K^{-4}$
Gravitational constant	G	6.670	15	10^{-11}	N $m^2 kg^{-2}$	10^{-8}	dyn $cm^2 g^{-2}$

*Based on 3 std. dev., applies to last digits in preceding col. †Electromagnetic syst.
‡Electrostatic syst. [1] Reprinted with revisions from NBS TNB, Oct. 1963.

☆ GPO 1969 O- 335-340